CHAPTER 7. REGULATIONS AND GUIDELINES

Pertinent international and national regulations, advisories, and guidelines regarding mercury in air, water, and other media are summarized in Table 7-1. This table is not an exhaustive list, and current regulations should be verified by the appropriate regulatory agency.

ATSDR develops MRLs, which are substance-specific guidelines intended to serve as screening levels by ATSDR health assessors and other responders to identify contaminants and potential health effects that may be of concern at hazardous waste sites. See Section 1.3 and Appendix A for detailed information on the MRLs for mercury.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
<th>Information</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air</strong></td>
<td><strong>EPA</strong> RfC</td>
<td>Mercury, elemental</td>
<td>IRIS 1995a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3x10^{-4} mg/m^3 (0.00004 ppm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>WHO</strong> Air quality guidelines</td>
<td>Mercury vapor</td>
<td>WHO 2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 µg/m^3 annual average (0.0001 ppm)</td>
<td></td>
</tr>
<tr>
<td><strong>Water &amp; Food</strong></td>
<td><strong>EPA</strong> Drinking water standards and health advisories</td>
<td>Mercury, inorganic</td>
<td>EPA 2018a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-Day health advisory (10-kg child)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-Day health advisory (10-kg child)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DWEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifetime health advisory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National primary drinking water regulations</td>
<td>No data</td>
<td>EPA 2009</td>
</tr>
<tr>
<td></td>
<td>Mercury, inorganic</td>
<td>MCL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.002 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>RfD</strong> Mercuric chloride</td>
<td>3x10^{-4} mg/kg/day</td>
<td>IRIS 1995b</td>
</tr>
<tr>
<td></td>
<td>Methylmercury</td>
<td>1x10^{-4} mg/kg/day</td>
<td>IRIS 2001</td>
</tr>
<tr>
<td></td>
<td>Phenylmercuric acetate</td>
<td>8x10^{-5} mg/kg/day</td>
<td>IRIS 1987</td>
</tr>
<tr>
<td></td>
<td><strong>WHO</strong> Drinking water quality guidelines</td>
<td>Mercury, inorganic</td>
<td>WHO 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guideline value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TDI</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.006 mg/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 µg/kg body weight</td>
<td></td>
</tr>
</tbody>
</table>
## Table 7-1. Regulations and Guidelines Applicable to Mercury (Hg)

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
<th>Information</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provisional tolerable weekly intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury, inorganic</td>
<td>4 µg/kg body weight</td>
<td>WHO 2011</td>
</tr>
<tr>
<td></td>
<td>Methylmercury</td>
<td>1.6 µg/kg body weight</td>
<td>WHO 2007</td>
</tr>
<tr>
<td>FDA</td>
<td>Substances added to food&lt;sup&gt;a&lt;/sup&gt;</td>
<td>No data</td>
<td>FDA 2020</td>
</tr>
<tr>
<td></td>
<td>Action level in human food and animal feed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheat (pink kernels only)</td>
<td>1 ppm on pink kernels and an average of 10 or</td>
<td>FDA 2018a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>more pink kernels/500 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methylmercury (as Hg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fish, shellfish, crustaceans, other aquatic animals (fresh, frozen, or</td>
<td>1 ppm in edible portion</td>
<td>FDA 2018b</td>
</tr>
<tr>
<td></td>
<td>processed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allowable level in bottled water</td>
<td>Mercury</td>
<td>FDA 2017b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.002 mg/L</td>
<td></td>
</tr>
<tr>
<td>HHS</td>
<td>Carcinogenicity classification</td>
<td>No data</td>
<td>NTP 2016</td>
</tr>
<tr>
<td>EPA</td>
<td>Carcinogenicity classification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury, elemental</td>
<td>D&lt;sup&gt;b&lt;/sup&gt;</td>
<td>IRIS 1995a</td>
</tr>
<tr>
<td></td>
<td>Mercuric chloride</td>
<td>C&lt;sup&gt;c&lt;/sup&gt;</td>
<td>IRIS 1995b</td>
</tr>
<tr>
<td></td>
<td>Methylmercury</td>
<td>C&lt;sup&gt;c&lt;/sup&gt;</td>
<td>IRIS 2001</td>
</tr>
<tr>
<td>IARC</td>
<td>Carcinogenicity classification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury and inorganic mercury compounds</td>
<td>Group 3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>IARC 1993</td>
</tr>
<tr>
<td></td>
<td>Methylmercury compounds</td>
<td>Group 2B&lt;sup&gt;e&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>PEL (8-hour TWA) for general industry, shipyards, and construction</td>
<td></td>
<td>OSHA 2005, 2020a,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2020b, 2020c</td>
</tr>
<tr>
<td></td>
<td>Mercury, except (organo) alkyl compounds (as Hg)</td>
<td>1 mg/10 m³ (0.1 mg/m³)&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury (organo) alkyl compounds</td>
<td>0.01 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEL (ceiling) for general industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury (organo) alkyl compounds</td>
<td>0.04 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>NIOSH</td>
<td>REL (up to 10-hour TWA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury vapor</td>
<td>0.05 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td>NIOSH 2019a</td>
</tr>
<tr>
<td></td>
<td>Mercury (organo) alkyl compounds (as Hg)</td>
<td>0.01 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td>NIOSH 2019b</td>
</tr>
<tr>
<td></td>
<td>REL (ceiling)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury compounds except (organo) alkyls (as Hg)</td>
<td>0.1 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td>NIOSH 2019a</td>
</tr>
<tr>
<td></td>
<td>STEL&lt;sup&gt;g&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury (organo) alkyl compounds (as Hg)</td>
<td>0.03 mg/m³&lt;sup&gt;f&lt;/sup&gt;</td>
<td>NIOSH 2019b</td>
</tr>
</tbody>
</table>

<sup>a</sup> Substances added to food not subject to a tolerable weekly intake.

<sup>b</sup> 10-year average.

<sup>c</sup> 8-hour TWA.

<sup>d</sup> Not new data.

<sup>e</sup> Not new data.

<sup>f</sup> 10-hour TWA, unless otherwise noted.

<sup>g</sup> 15-minute TWA.
### Table 7-1. Regulations and Guidelines Applicable to Mercury (Hg)

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
<th>Information</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDLH</td>
<td>Mercury compounds except (organo) alkyls (as Hg)</td>
<td>10 mg/m³</td>
<td>NIOSH 1994a</td>
</tr>
<tr>
<td></td>
<td>Mercury (organo) alkyl compounds (as Hg)</td>
<td>2 mg/m³</td>
<td>NIOSH 1994b</td>
</tr>
<tr>
<td></td>
<td><strong>Emergency Criteria</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPA</td>
<td>AEGLs-air</td>
<td></td>
<td>EPA 2018b</td>
</tr>
<tr>
<td></td>
<td>Mercury vapor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEGL 1h</td>
<td>Not recommended</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEGL 2h</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-minute</td>
<td>3.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-minute</td>
<td>2.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60-minute</td>
<td>1.7 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-hour</td>
<td>0.67 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>0.33 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEGL 3h</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-minute</td>
<td>16 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-minute</td>
<td>11 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60-minute</td>
<td>8.9 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-hour</td>
<td>2.2 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>2.2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>DOE</td>
<td>PACs-air</td>
<td></td>
<td>DOE 2018a</td>
</tr>
<tr>
<td></td>
<td>Mercury vapor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-1i</td>
<td>0.15 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-2i</td>
<td>1.7 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-3i</td>
<td>8.9 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury(II) chloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-1i</td>
<td>0.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-2i</td>
<td>0.14 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-3i</td>
<td>38 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercury(I) chloride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-1i</td>
<td>0.088 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-2i</td>
<td>0.12 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-3i</td>
<td>33 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mercuric acetate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-1i</td>
<td>0.048 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-2i</td>
<td>0.64 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-3i</td>
<td>3.2 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dimethylmercury</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-1i</td>
<td>0.034 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-2i</td>
<td>0.046 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAC-3i</td>
<td>2.3 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

***DRAFT FOR PUBLIC COMMENT***
### Table 7-1. Regulations and Guidelines Applicable to Mercury (Hg)

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
<th>Information</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylmercury acetate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAC-1&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PAC-2&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>22 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PAC-3&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>47 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Methylmercury</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAC-1&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>0.032 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PAC-2&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>0.043 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PAC-3&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td>2.1 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> The Substances Added to Food inventory replaces EAFUS and contains the following types of ingredients: food and color additives listed in FDA regulations, flavoring substances evaluated by FEMA or JECFA, GRAS substances listed in FDA regulations, substances approved for specific uses in food prior to September 6, 1958, substances that are listed in FDA regulations as prohibited from use in food, delisted color additives, and some substances “no longer FEMA GRAS”.

<sup>b</sup> D: not classifiable as to human carcinogenicity.

<sup>c</sup> C: possible human carcinogen.

<sup>d</sup> Group 3: not classifiable as to its carcinogenicity to humans.

<sup>e</sup> Group 2B: possibly carcinogenic to humans.

<sup>f</sup> Skin notation.

<sup>g</sup> Short-term exposure limit, a 15-minute TWA exposure that should not be exceeded at any time during a workday.

<sup>h</sup> Definitions of AEGL terminology are available from U.S. Environmental Protection Agency (EPA 2018c).

<sup>i</sup> Definitions of PAC terminology are available from U.S. Department of Energy (DOE 2018b).

AEGL = acute exposure guideline levels; DOE = Department of Energy; DWEL = drinking water equivalent level; EAFUS = Everything Added to Food in the United States; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; FEMA = Flavor and Extract Manufacturers Association of the United States; GRAS = generally recognized as safe; HHS = Department of Health and Human Services; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health; IRIS = Integrated Risk Information System; JECFA = Joint FAO/WHO Expert Committee on Food Additives; MCL = maximum contaminant level; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PAC = protective action criteria; PEL = permissible exposure limit; REL = recommended exposure limit; RfC = inhalation reference concentration; RfD = oral reference dose; STEL = short-term exposure limit; TDI = tolerable daily intake; TWA = time-weighted average; WHO = World Health Organization.